INTRODUCTION

Environment is simply the world in which we live. It is not merely the atmosphere and other physical factors surrounding us, but is the complex of all factors which affect one organism all the time. But nowadays many activities done by human beings like building construction, water exploitation, urbanization, throwing out the waste materials, smoke of factories damage the environment at a large scale. We do not think about the impact of such harmful activities done on a daily basis against natural environment. We simply forgot about the prominent statement given by Mahatma Gandhi a few decades ago, when environment was not a buzz word. He said "The earth provides enough to satisfy everyman's need, but not every man's greed". This is the statement with profound social, economic, cultural and ethical ramifications. The main reason behind this environmental hazard is the unsustainable development by the human being. Concern for environment must encompass land, water resources, forest, atmosphere, habitat, people, health, energy, etc., such that a better understanding of the prevailing conditions may be acquired. According to Menaria (1989), it is an obligation for each generation to maintain the productive capacity of land, air, water and wild life in a manner which leaves its successors some choice in the creation of healthy environment. In various ways an environmentalist is a person who may advocate the sustainable management of resources and stewardship of the natural environment through changes in public policy or individual behaviour. In various ways environmentalists and environmental organizations seek to give the natural world a stronger voice in human affairs. Though, the modern environmental movement arose during the industrial revolution, a concern for environment protection had occurred in diverse forms, in different parts of the world, throughout history.
Since late 1960’s, due to increasing industrialization and extra resources utilization, the destruction of environment in modern times has become a globally critical problem. Man is now continuously exploiting his environment and the natural resources for the sake of his comforts and leisure. The phenomenal increase in human population followed by fast growing industrialization and urbanization in the last few centuries have overstrained the environment resulting in the continuing depletion of natural resources, deforestation, extinction of many plant and animal species, rise in global temperature, environmental pollution, thinning of life saving ozone layer etc. These problems are further being compounded with population explosion, food crises, hunger, malnutrition, poverty, insanitation and unbridled consumerism which together have caused serious strains on the essential life support systems of our planet, even threatening all living beings including man himself with disaster or extinction. Now the challenge is to live sustainably and well but within the material limits of finite planet resources. In this way we are, in fact, living and borrowing the times and lives of our grandchildren and beyond. Human societies are facing crisis of existence. The environment damage already inflicted due to alarming ongoing population explosion, rapid urbanization and industrialization, increasing needs of energy and fast scientific and technological advancement cannot be reversed unless there is collective thinking, will and efforts. These call for public awareness and participation for bringing about an attitude change and finally restricting further damage to the environment. Now there is cry all over for protection and preservation of environment. Resolution of current ecological dilemma will necessitate not only technological changes and improved scientific knowledge, but also changes in people’s behaviour. Following the famous Brundtland report, “Our Common Future” (WCED, 1987) which recognized that natural resources are not inexhaustible and the development process should be aimed, “to meet the needs of present generation without compromising the ability of the future generation to meet their own needs.” The findings of this report are
highly essential for constant monitoring, evaluation and periodic updating of our data on environment and resource management through research and analysis. At the same time, it is necessary to disseminate this information for the awareness, understanding and motivation of the people in order to change their behaviour, practices and lifestyle. Education is first and foremost a human right as proclaimed in Article 26 of Universal Declaration of Human Rights. It not only makes man flexible to change and adjust to the new situations but acts as the key to building up the skills and capacities in all domains necessary for techno-economic development. In the future world, education should not only be concerned with simple transmission of knowledge but must foster all forms of behaviour, life styles, and values necessary for human survival on a crowded planet (Mayer & Frantz, 1997). The UN conference on environment and development popularly known as “Earth Summit” (1992) in its agenda 21 gave importance on “Education, awareness and training” the critical factors of public understanding which are fundamental to any progress to be made. It stressed reorienting education, critical for promoting sustainable development and improving the capacity of people to address the environment development issues.

Therefore, to manage our earth, we must make people aware regarding the environment and help them develop environment friendly behaviour. With this acquired behaviour, one will definitely overcome the impending disaster. These changes can be brought about only through a continuous, lifelong interdisciplinary Environmental Education, which can develop sensitivity, awareness, knowledge, skills, values and attitudes towards such environmental issues and help one to lead a desired quality of life. As such, the environment protection and conservation has been the need of the hour. Realizing its importance, India has also enshrined it into Constitution which requires both state and citizen to protect, preserve and improve the environment. India accepted Environmental Education with recommendations of Tiwari Committee (1980) and consequently, a
Department of Environment was set up in 1982 at Ahmedabad. So, Environmental Education has been accepted as the compulsory subject in India at secondary school stage and at college level. It is a way of implementing the goals of environment protection. Environmental Education has assumed great importance in recent years since life on this planet depends, to a large measure, on our response to the emerging problems related to environment. It aims to make citizens aware and conscious about the hazardous impact of environment degradation and pollution and to generate knowledge, awareness and consciousness among them about different environmental components. Environmental Education is the subject for everyone. The earlier one starts, the better are the results. Teachers, being the most critical agents of change, are responsible for growth, development and progress of the societies and communities. They not only disseminate knowledge but also create and generate new knowledge. It is assumed that enlightened, emancipated and empowered teachers lead communities and nations in their march towards better and higher quality of life. Hence, teachers’ education at basic as well as at professional level has a special role to play in sustainable development of the environment. Teachers’ knowledge and understanding of environment and developmental issues and level of commitment, attitude and devotion will determine the future society and its development.

Normally in a classroom, students are taught about environmental concepts by the teacher through traditional methods. Lecturing is the heart of traditional method. There is no doubt that lecturing is extremely useful for imparting large amount of factual information to large number of pupils in short duration of time. However, it is also accepted that information imparted through lecturing method is not retained by the learner for a long time. So, in order to cater to the needs of the individual learner, they should be provided with enriched educational programme based on enhancing their environmental sensitivity, awareness, attitude and ethics. Environmental
problems cannot be solved within days, rather it requires rigorous efforts at school level. So, teachers are one of the important factor, which is bound to affect this programme. Teachers can prove to be a vital link in the delivery of environmental knowledge, making people aware about its associated problems and their solution by use of technology. It has also been acknowledged that Environmental Education must be learner centered.

It is a well known fact that not a single teacher is capable of giving up to date and complete information on the subject. In order to cater to the needs of individual learner one of the important, innovative and participatory method of instruction gaining momentum is the use of Information and Communication Technology (ICT). Information and Communication Technology can be used to provide Environmental Education to masses. Maximum information with the help of technology can be provided to the learners. Thus, ICT emerged out as IT+ other media. It has opened new avenues like online learning, e-learning, e-coaching, e-education, e-journal, etc. It opens up a new source of information which decreases the limitation of access to information. Imparting instruction through ICT can fill the gaps of traditional teaching because it can provide access to different sources of information. It will provide correct information as comprehensively as possible in different formats with different examples. ICT provides online interaction facility. Students and teachers can exchange their ideas and views, and get clarification on any topic from different experts, practitioners, etc. It help learners to broaden the information base. ICT provides a variety in the presentation of content which help learners in concentration, better understanding, and long retention of information which is not possible otherwise. It helps in qualitative improvement of teaching-learning process. It also provides flexibility to learner which is denied by the traditional method. This flexibility is a must for mastery learning and quality learning.
1.2 ENVIRONMENT AND EDUCATION

The word “Education” originated from the Latin word “Educate” which means “to bring out”. Therefore, education means becoming developed or progressive from inside to outside. According to Swami Vivekananda, “Education is the manifestation of divine perfection that already exists in man”. Education is a unique investment in the present and future. It begins at birth, and is a life-long process that continues till death.

The word “Environment” is derived from the French word ‘environment’ which means to encircle or surround. All the biological and non-biological things surrounding an organism are thus included in environment. Environment is defined as the sum total of all the living and non-living things around us influencing one another.

The conjunction of the two entirely different words ‘Environment’ and ‘Education’ raises the key questions as to why, where, and for what purpose these words have been linked. A worldwide concern about the need to protect the environment originated only after the publication of Carson’s “Silent Spring” (1962). This book gave an important message against the heavy use of insecticides for mosquito control. This message gave an insight into the indiscriminate use of poisonous chemicals. During the later years ‘Environment’, a word that not many had heard of or much less thought of, became a widely discussed issue. However, it has soon become apparent that the present imbalance in the environment has been created by an unbalanced relationship between man and environment. Urgent remedial measures are required in preserving the good earth on which we live. But this cannot be achieved through enacting laws or indoctrination. What is required is awareness among the population about the need for an optional and undisturbed environment to improve the quality of life. Gradually, a realization has come that fight against environmental degradation is an issue of every body’s concern. So, attempts are to be made to explore ways to sensitize the people about the intimate relationship between the quality of
the environment and human well-being. The need is not only of preserving the environment and maintaining the quality of life but also in educating the present generation about the environment and inculcating in them an eco-friendly behavioural pattern. So, the main objectives of Environmental Education are that individual and social groups should acquire awareness and knowledge, developing attitude, skills and abilities in order to participate in solving real local environmental problems. The Environmental Education evolved rapidly as a curricular concept (Palmer, 1992).

With the organization of international conference on “Human Environment” in Stockholm in Sweden by the United Nations in 1972, the movements of Environmental Education become truly international. The conference established the need of Environmental Education in view of generalized environmental problems and showed that there is wide interest among the people to solve these problems. Various education commissions and committees instituted by Government of India at various times also stressed the need for a close link between education and environment. Since 1963, text books on general science and social studies and instructional materials introduced at different steps in school education, have been recognized towards keeping in mind the environmental facilities and necessities. Recognizing the potentials on education in creating an environmentally conscious society in the National Policy of Education (1986), Government of India states that “there is a paramount need to create a consciousness of environment. It must permeate all ages and sections of the society, beginning with the child”. Environment consciousness should inform teaching in school and colleges. The aspect will be integrated in the entire educational process (Siddiqi, 1998).

1.3 ENVIRONMENTAL EDUCATION

Good Environmental Education like any good education must lead students out and on from their immediate perceptions and experiences to a wider understanding, which must develop their capacity. Such an education
may also happen by chance. A number of subjects and aspects of the school curriculum deal with the subject interplay between man and his environment. Pupils must learn about natural phenomena in order to understand complex environmental matters. The importance of Environmental Education is that it sensitizes us to the causes and effects of problems of which, for long, we have been only dimly aware. Environmental Education today serves as a common thread uniting long standing interests and emphasizing study of the nature, conservation education, and outdoor development of explicit and implicit inter-connection with human health and science education. Environmental Education is the process of educating the people to preserve quality of environment. It provides skills and attitudes needed to play a productive role in improving life and values in order to enable people to enjoy good health and high quality of life. In the words of Cook & Hearn (1971), “Environment Education is problem-centered, inter disciplinary, value-oriented, and concerns with man’s survival as species, based on student-initiated activities and involvements present and future oriented”.

Environmental Education has also been characterized by the technology, and the environmental, economic, and social issues and problems of society. It is generally accepted that increased concern for environmental quality and fear of severe deterioration of human health and quality gave impetus for synthesis leading to Environmental Education. Every individual has the right to seek a healthy environment to live in. It makes environmental awareness and Environmental Education internationally imperative. The most hazardous event of the 21st century is the rapid degradation of environment quality. The population explosion creates situation like more people needing more food, more energy, and more things of daily use, such as housing, clothing and automobiles. As a result we use more water resources, fertilizers and pesticides for production and in turn, increase the level of air and water pollution besides disturbing
the ecological balance. All these conditions causes diseases and death in many species of animals, birds and human beings. Similarly the indiscriminate use of renewable and non-renewable physical resources lead to severe difficulties.

Lack of environmental awareness about preservation and conservation of environment effectively add fuel to fire. All these are greatly responsible for rapid degradation of the environmental quality at grass root level. If a similar situation continues in the near future, the entire human civilization will face disastrous situations in various spheres. At this juncture, the only alternative is to create environmental sensitization and awareness among the people in respect of protection, preservation and conservation of environment, and also for the mitigation of environmental degradation. Further, the environmental awareness moves people towards environmental protection and environmental preservation and to develop environmental ethics and attitudes. All these are possible only through Environmental Education. Environmental Education should result in the development of ecological ethics, and enable the individual and the society to perceive environment in its totality and integrate physical, biological, technological, socio-cultural, moral, historical and aesthetical components. In a country like India where 76% of its population lives in rural and tribal areas, Environmental Education is necessary to protect our environment and to attain sustainable development. The critical aim of Environmental Education is the development of behaviour which is in accordance with the environmental needs. This means to foster our knowledge and experience into every one’s life. Therefore, Environmental Education should be related to the problem as they exist in the pupils.

Education in the past has been lopsidedly anthropocentric ignoring its eco-centric integration, for after all humans and their environment are inseparable and are utterly interdependent for mutual survival. Consequently, most of the educationists and environmentalists have stressed
on the environmental literacy for all (Knimiller, 1983). The first use of the term, Environmental Education (EE) goes back to 1960 at an IUCN (International Union for Conservation of Nature and Natural Resources) meeting held at Paris. With the first UN sponsored conference on “Human Environment” held in Stockholm in June 1972, to assess the damage done to environment on a global level and contemplate on ways and means of protecting those, human dimension of environmental protection and conservation has been highlighted with stress on the need for environmental awareness and education. Though this conference approved the action plan for Environmental Education, major recognition was given to it in 1975 at International Environmental Education workshop held at Belgrade, followed by the workshop “The Tibilisi Inter-governmental conference on EE” held at Georgia in 1977. With the publication of the report “Our Common Future” by World Commission on Environment and Development (WCED, 1987) set up by the United Nations General Assembly, environmental agenda acquired new term called as Sustainable Development. It recognized that natural resources are not inexhaustible and the developmental process should be aimed to meet the needs of the present generation without compromising the ability of the future generations to meet their own needs. Thus the dividends of development must flow continuously through generations for not only alleviating poverty but also upgrading the quality of life. Sustainable development is possible if principles of ecology are followed in planning developmental activities and long-term socio-economic need is kept in view and not just short-term profit. It looks to the upliftment of all citizens of a society to a quality of life which enables them realize their potential, build self-confidence and live life of fulfillment and dignity. Such sustainable development conserves land, water, plant, and animal reservoirs and looks for approaches that are environmentally non-degrading, technically appropriate, economically viable and socially acceptable.
On the whole Environmental Education stresses everything that we can do to save the planet. It emphasizes that development should be aimed at improving the quality of life of all sections of the population, combating poverty, protecting environment and most importantly building the innermost capacity of mutual respect, tolerance, co-operation and peaceful co-existence. All international gatherings and conferences have emphasized on sustainable development and Environmental Education. The Millennium Development Goals (MDG), adopted by 189 nations in 2000 as a part of comprehensive development agenda, has repeatedly stressed on environmental sustainability. The World Summit on Sustainable Development (WSSD) held at Johannesburg in 2002 noted that much of the current education falls far short of what is required and calls for a new vision and deeper and more ambitious way of thinking about education to promote Environmental Education. Subsequently UNO’s proclamation of 2005-14 as the Decade of Education for Sustainable Development (DESD) in 2002 by its general assembly resolution 57/254, calls for education for learning of values, behaviour and life styles required for a sustainable future and for possible societal transformation. The major focus of DESD is to foster an increased quality of teaching and learning in environment and to provide countries with new opportunities to incorporate Environmental Education into educational reform efforts. As such, Environmental Education has come to be seen as a process of learning how to make decisions that consider the long term future of the economy, ecology and equity of all communities. Building the capacity of such future-oriented thinking is a key task of teachers and educators.

In India, the environmental action formally started with the participation of Mrs. Indira Gandhi in the United Nations Conference on Human Environment in Stockholm in 1972. A national committee on environmental planning and co-ordination was established to be the apex body in the department of science and technology. The term environment...
was figured for the first time in the fourth five year plan (1969-74) which recorded that “harmonious development is possible only on the basis of a comprehensive appraisal of environmental issues”. National Policy on Education (1986) emphasizing the role of Environmental Education says that, “There is a paramount need to create a consciousness of the environment. It must permeate all ages and all sections of the society, beginning with the child. Environmental consciousness should be inculcated into teaching in schools and colleges”. Environmental Education is a key to the success of any overall environmental strategy determined to help in the setting up of a centre of excellence in Environmental Education to play the vital role of setting the pace and agenda for Environmental Education in the country (Kartikeya, 2000). In India, the Supreme Court in their judgments of writ petitions (M.C. Mehta Vs Union of India, 1991; M.C. Mehta Vs Union of India, 2003) has directed for the urgent need for Environmental Education. The Supreme Court bench had issued an order on November 22, 1991 to all states governments, and to State Education Boards, to make Environmental Education, a compulsory subject. The Supreme Court issued notices to some of the country’s key educational bodies and State Governments for negligence in the implementation process of Environmental Education as a compulsory subject. The Supreme Court directed the NCERT to take appropriate steps to prescribe a course on environment and to consider the feasibility of making Environmental Education a compulsory subject at the school level. In pursuance of this, the NCERT framed the syllabus and incorporated Environment Education as compulsory subject from IX to XII standards. The most recent developments are the introduction of Environmental Science as compulsory course for all the undergraduates after the intervention of Supreme Court and the introduction of Environmental Studies (EVS) as a curricula area at primary stage (1st to 5th class). EVS combines science with social studies and environment and stresses the link between teaching and the immediate environment of the child.
The UNESCO-UNEP International Environmental Education programme had emphatically pointed out that to improve the effectiveness of Environmental Education, teacher preparation is ranked as “the priority of priorities”. The UGC has reconstructed the teacher education programmes in universities by including Environmental Education in the curricula for Teacher Education. The major aim of these educational programmes is to provide scientific knowledge and insight into the real nature, scope, importance and conceptual clarification of the issues involved to prospective teachers and teacher educators. It also aims to developing skills to impart proper Environmental Education to school students in a natural but comprehensive way. A strong Environmental Education system which has its footings on strong environmental pedagogy is what is required at present at all levels of education. Teachers with the right attitude and a will to equip the future generations to enable them imbibe the virtues of sustainable development are to take the lead.

Environmental Education is a learning process that increases students’ knowledge, awareness about the environment and associated challenges, develops the necessary skills, foster attitude, commitment to take decisions and responsible actions. So, Environmental Education must be integrated into the whole system of formal education at various levels of school curriculum. An Environmental Education programme based on a sound pedagogical basis should be directed towards achieving the objectives formulated in Tbilisi conference (UNESCO/UNEP International conference), 1975. These objectives are as follows:

1. Awareness: To develop individuals and social groups acquire an awareness and sensitivity to the total environment and its associated problems.

2. Knowledge: To develop individuals and social groups acquire basic understanding of the total environment and its associated problems and humanity’s critically responsible presence and role in it.
3. Attitude: To develop individuals and social groups to acquire social values, strong feelings of concern for the environment and motivation to actively participate in its protection and improvement.

4. Skills: To help individual and social groups to acquire the knowledge and skills of solving the environmental problems.

5. Evaluation ability: To help individual and social groups evaluate environmental measures and educational programme in terms of ecological, political, economical, social, aesthetic and educational factors.

6. Participation: To help individual and social groups develop a sense of responsibility and urgency, regarding environmental problems to ensure appropriate action for solving the problems.

The spectrum of Environmental Education falls in four major integrating components: awareness, real life situation, conservation and sustainable development. This has to be watched with the needs of the primary, secondary, higher secondary and the adult education (Khoshoo & Subramanian, 1991). The goal of Environmental Education is to develop world population that is aware of and concerned about the environment and its associated problems and which has the knowledge, skills, attitude, motivation and commitment to work individually and collectively towards the solution of current problems and preservation of new ones (Saxena, 1996). Environmental Education is indeed very important to child and adult for self-fulfillment and social development. It helps in the maintenance of life and health and in self preservation of human race.

Surveys conducted by UNESCO-UNEP, 1982, in ascertaining Environmental Education requirements in the country, have clearly indicated that the most pressing requirements are the areas of:

1. Developing and distributing quality teaching learning materials.
2. Equipping the teachers and resource persons with the knowledge, understanding and skills in imparting Environmental Education.
3. Conducting action research and experimentation to promote Environmental Education.

4. Networking with various institutions for information resources and expertise.

   Analyzing the different approaches followed by the agencies, three broad approaches are listed below. They are:

1. Developing educational materials around local specific environmental problems or issues and linking them with appropriate concepts in the textbook.

2. Developing educational materials on most essential environmental themes or topic and integrating them into the school curriculum.

3. Developing educational materials around bio-geographic elements of local (specific to the ecosystem) and introducing them into school curriculum.

Our educational system, both qualitatively and quantitatively, has been patterned after the western model, the relevance of which is questionable under our conditions. Gandhiji first realized this and started Basic Education Programme. This is particularly applicable to Environmental Education. Today, while almost everyone recognizes the urgent need for Environmental Education, only some have clear ideas about what needs to be done, and the knowledge about how such courses have to be successfully taught. Environmental Education aims at building up awareness followed by real life situation, conservation and sustainable development. The real life situation links environment to actual life. Here different environmental aspects need to be emphasized in different environmental situations. For instance, in our country, in the prominently industrial states, emphasis would be on air and water pollution. Infact, in the forest based states in the North East as also in the Himalayan belt, it would be on the whole range of negative impact of deforestation and grazing, whereas agricultural states
would lay stress on pollution due to agricultural practices, ranging from negative impact of irrigation, to accumulation of agricultural chemicals affecting soil and health. In contrast to the awareness where attitudes are important, in real life situations the emphasis would shift to practical aspects as related to the local circumstances. From the lower secondary stage onwards, the attempts should be to emphasise, in an increasing manner, the inter-connectedness, inter-relatedness and inter dependences of the different components of life support system together with the role human beings can play to set the right path and prevent future damage to the environment. Environmental Education is very important for self-fulfillment and social development. Environmental Education is needed for the protection and preservation of environment in order to maintain the quality of life. The role of students should go a long way in strengthening the Environmental Education for society. So, we can conclude that Environmental Education means the educational process dealing with man’s relationship with the natural and manmade surroundings. It should aim not merely at imparting knowledge and understanding of man’s total environment but also at including skills, attitudes and values necessary to understand and appreciate the interrelatedness among man, his culture and his biophysical surroundings. Environmental Education is not a separate branch of science but it is a life-long integral education. Environment is a global concept today. Environmental Education is an approach to learning and not a subject to be merely studied. It endeavors to create a way of thinking requiring people to overcome prejudices. It helps in programming the learning experiences ranging from the simple to the complex. The principle of Environmental Education is that it makes the child’s education problem-based for understanding the environment and the hazards of pollution. The Environmental Education curriculum is socially relevant as it tells how unchecked and unplanned development pollutes air, water, and soil, thereby threatening our subsistence and existence. Environmental Education is very important for the child and the adult for self-fulfillment and social
development. It helps in the maintenance of life to get good health. Environmental Education helps to understand and appreciate how the environment is used for making a living and for promoting a material culture. It helps in appreciating and enjoying the nature and society.

Environmental protection starts by creating awareness among the people so that it becomes part of people’s life style. Environmental Education addresses issues of population explosion, exhaustion of natural resources and pollution of the environment and sheds light on methods of solving them. Thus, Environmental Education is a process of developing a world population that is aware of and concerned about the total environment and its associated problems, and which has the knowledge, skills, attitudes, motivation and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones. The Hon’ble Supreme Court of India directed that Environmental Education should be taught as a compulsory subject at all levels of the education. Inspite of this order, Environmental Education, as part of formal education, is still in its infancy.

1.4 ENVIRONMENTAL SENSITIVITY

Environmental sensitivity is defined as a set of affective characteristics which result in an individual viewing the environment from an empathetic perspective (Paterson, 1982). It is apparently slow to develop and is most closely correlated to those who grew up in close proximity to a natural setting. Individuals who are sensitive to the environment posses a basic appreciation and concern for the natural environment. More commonly they can and do motivate the others to learn more about the natural environment (ecology) and about a variety of environmental problems and issues. Research indicates that environmental sensitivity prevails more commonly among those who behave in environmentally responsible way than among those do not (Marcinkowski, 1988; Sia, Hungerford & Tomera, 1985; Sivek & Hungerford, 1989). The researches into environmental
sensitivity are of relative recent origin, primarily because it has been so difficult to measure. In early 1980’s Tanner (1980) and Paterson (1982) developed a method of measuring sensitivity which involved the identification of individual’s past experiences which appeared to regularly contribute to the formation of these affective characteristics. Additional use of this method and additional research evidence strongly suggests its validity (Marcinkowski, 1988). Further, a more recent body of research suggests that environmental sensitivity is a significant and major predictor of environmentally responsible behavior (Sia, et al., 1985; Marcinkowski, 1988; Sivek, 1988). As such environmental sensitivity appears to be an important experiential and motivational precursor for the sustained development of environmental literate individuals. Apparently there are experiential, affective and cognitive aspects to the development of sensitivity. While sensitivity is itself an affective variable, its development appears to result from interplay of outdoor experiences, favorable human interaction and knowledge about the natural environment. Paterson’s sample of professional environmental educators reported interest in the outdoor and natural systems which contributed to an initial environmental sensitivity at an early age (X=12.25 years). Enriched by frequent experiences in natural setting and open spaces, this sensitivity continued for years and strengthens through their growth. This sensitivity was further reinforced by an increasing knowledge about natural systems, and was nurtured through both direct (i.e. familial and non familial) and indirect (e.g. authors) role models. These role models were themselves empathetic towards the environment and usually actively involved in variety of environmental activities and interests. These findings suggest that there are several dimensions of environmental sensitivity, which hold important implications for the types of educational experiences provided for the teachers and in turn for their students. The formative outdoor experiences described in Paterson’s sample include activities such as exploring and playing as a child, hunting and fishing, and involvement in outdoor oriented youth organization or in group camping.
Moreover these experiences often occurred in solitary, small group or family settings. Therefore, formal pre-college education would be hard-pressed to include within its curricula these kinds of activities described by Paterson’s sample. For this reason, it is also difficult to draft realistic goal statements for these facts of environmental sensitivity even though these kinds of experiences should be encouraged by and in school programmes. On the other hand, formal school education can include two other salient factors affecting the development of environmental sensitivity. These two factors role models and environmental knowledge are often closely related. Paterson suggested that educator role models appear to be as important as outdoor experiences in developing environmental sensitivity and that Environmental Education programmes should provide exposure to environmentally concerned and active individuals. In various studies it is found that teachers contributed the majority of the role models named thereby stimulating interests in natural systems as well as providing educational and professional guidance. Due to budget outbacks many schools cannot afford residential camp experiences or even field trips for students. Fortunately, there are experiences that can promote environmental sensitivity and such experiences are often within the reach of a school to provide. Whatever possible, learner should be permitted and encouraged to take part in outdoor experiences such as gardening, establishing a contact with nature and natural areas, and even reclaiming a deteriorated natural area. These experiences can take place on or near the school ground and can be both educational and recreational. In this many of the ecological concepts and principals to be taught can be enhanced through outdoor experiences. Research on environmental sensitivity also indicates that books, slides, C.D’s, video tapes, music and other materials can provide learner sensitivity towards the environment. Similarly, related work of nature photographs, environment documentaries, wildlife artists and musicians would probably encourage sensitivity in a number of individuals. Role models of environmental sensitivity can be shared through story book tales, newspaper articles or personal experiences.
So, we can say that environmental sensitivity refers to an empathetic perspective towards the environment. It includes the affective domain as well as the cognitive domain. Individuals must have some cognitive knowledge of the environment to develop an intelligent concern for their natural surroundings. Sensitivity towards the environment refers to the attributes of feelings, beliefs and emotions about environmental concerns viz. population explosion, health and hygiene, environmental pollution, wildlife and forests and concern for the conservation of environment.

1.5 ENVIRONMENTAL AWARENESS

Knowledge acquired, if not put into action is of no use and will go waste. Today, all lives are at stake due to environmental pollution and the root cause of this is over population, greed and unconcerned attitude of human beings towards humanity. There is a lot of awareness about the protection of environment that is taking roots amongst the youngsters. If this awareness manifests itself in the form of execution then the world will be a better place to live in. We often talk of clean and green environment but little do we think of using eco-friendly products. Since the sixties, concern over the state of environment has grown worldwide. Modern environmentalist starts with the promise that “We bear the responsibility of our action towards nature and therefore our eyes and heart must be educated”. The school education can significantly promote environmental awareness. Environmental Education became the integral component of the National Policy on Education, 1986. It was declared that there is a need to create consciousness of the environment which must permeate all the ages and all sections of the society. As a result of directions issued by Supreme Court, Environmental Education was made mandatory for undergraduates and Environmental Science (EVS) was introduced as a subject in Class I to V. The curriculum on Environmental Education was prepared by N.C.E.R.T. in accordance with the guidelines laid down by the N.C.F. (National Curriculum Framework), 2005 and as per the directives of the honorable
Supreme Court of India, and adopted by the C.B.S.E. (Central Board of Secondary Education) and various state boards. The syllabus encourages the learner to observe their surrounding critically and understand the importance of a healthy environment.

Environmental awareness is the growth and development of understanding and consciousness towards the biophysical environment and its problems, including human interactions and effects i.e. thinking “ecologically” or in terms of an ecological consciousness. It is knowing and understanding various environmental issues like causes of pollution, conservation of wild life, natural resources, forest, animals, water, food and land needed to preserve and save them, energy conservation, reuse and recycling of waste material, local agencies responsible for its disposal and conservation of human health.

Environmental awareness is the mirror image of all the knowledge one has after going through rigorous curriculum in the school which provides detailed knowledge about environment and current environmental problems. A person with high environmental awareness realizes that an effort is required individually and in group, to improve general environmental conditions. It is our foremost duty to conserve our environmental resources. The ultimate goal of Environmental Education whether it is formal or non-formal is to create awareness among the citizens of a country. This can be understood by the quotation mentioned in the Belgrade Charter, which was issued in the Environmental Education workshop held at Belgrade, Yugoslavia in 1975 (Tanner, 1980). It emphasizes the basic aim of Environmental Education as the development of “a world population that is aware of and concerned about the environment, its associated problems, so that the population will have the knowledge, skill, attitudes, motivation and commitment to work individually and collectively towards the solutions of current problems and prevention of new ones”.

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Global concern regarding the steadily deteriorating state of the environment has emphasized the need for Environmental Education. Obviously, a powerful vehicle bringing about change, a panacea of all evils and a potent weapon for prevention plays a central role in the society. The need of the hour is to make people sensitive towards nature through a strong programme of Environmental Education. Environmental Education is a way of creating knowledge, understanding, values, attitudes, skills, abilities and awareness among individuals and social groups towards the environment protection. Environmental Education is an attempt to reorient education so that environmental competence is restored as one of its basic aims along with personal and social competence. It is not just a subject of education but an expansion of its whole philosophy recognizing our environment as continuous with ourselves and in need of the same care and understanding as we give to our personal and social well being (Smyth, 1995). World educators and environment specialists have repeatedly pointed out that a solution to environmental crisis will require an environmental awareness and its proper understanding which should be deeply rooted in the education system at all levels of school education. The existing curricula at primary, secondary and college levels provide a lot of opportunities to make the students aware of environment. The integration of Environmental Education is possible if teachers have a will to introduce it in a quite natural way while teaching different curricular areas at primary, secondary and higher education levels. In this present context, the need for studying the environment awareness of secondary school students is a must. It is very much an essential need for each individual to develop an awareness of protection and preservation towards environment. Our environment is threatened due to many hazards. Air, water and soil pollution are on the increase. Degradation of environment results in many problems. Therefore, there is a great need to protect and preserve our environment. The role of students would go a long way in achieving such desired goals. In order to fasten their awareness towards environment it is necessary to know what
levels of awareness they possess in these areas.

Thus, environmental awareness is that which provides power and understanding to take decisions individually and collectively and initiate actions for social, cultural, and economic survival, growth and development and for conservation of nature and natural resources. Environmental awareness means to help social groups and individual to acquire an awareness of and sensitivity to the total environment and its allied problems. It includes elimination of disease, hunger, malnutrition and poverty, destruction of forests, extermination of wild life, erosion of soil and accumulation of waste. Hence there is an urgent need for proper management of the environment. For the effective implementation of environmental programme of Environmental Education our teachers must have enough environmental awareness, positive environmental attitude and skills of achieving objectives in relation to their students.

The environmental damage has already been inflicted and cannot be reversed unless there is collective thinking, will and effort. These call for public awareness and participation for bringing about an attitudinal change and finally restricting further damage to the environment. Effective implementation of environmental management and conservation programmes depends on education, generating awareness and providing training in the relevant areas. Without an understanding of how to conserve natural resources and the compelling need to do so, few people would be motivated to participate actively in programmes on environment conservation. Environmental Education and awareness thus assume critical importance. The Environmental education, awareness and training is an important scheme of the Ministry for enhancing the understanding of people at all levels about the relationship between human beings and the environment and to develop capabilities/skills to improve and protect the environment. Thus, environmental awareness helps to acquire concern and sensitivity towards the environment and its problems.
1.6 ENVIRONMENTAL ETHICS

Every human being has the right to a decent life. But today there are elements in our environment that tend to militate against the attainment and enjoyment of such a life. The exacerbation of the pollution of environment can cause untold misery, unhappiness and sufferings of human beings crop up, simply because of our lack of concern for the common good and the absence of sense of responsibility and ethics for sustaining a balanced eco-system. If we are to aspire a better quality of life - one which will ensure freedom from want, from disease and from fear itself, then we must all join hands to stem out the increasing toxification of this earth (Sutaria, 1990).

Environmental ethics are concerned with the issue of responsible personal conduct with respect to environment. It is human responsibility towards nature and the remote future. It is ecological conscience or moral that reflects a commitment and responsibility towards the environment including plants and animals as well as present and future generations of people. It is concerned with the issue of responsible personal conduct with respect to natural landscapes, resources, species, and living organisms, population, global environmental issues, forests and wildlife conservation and waste generation and management.

Environmental ethics inculcate a precious code in the individuals and societies. They ought to be developed in each person to command him/her as a force from within to make decision and take action on the different aspects of the environment which are not harmful to the local, national and international community. Environmental ethics sharpen the judgement of a person not to jeopardize the health and security of other fellow beings for the sake of material and political gains. Environmental ethics are the scientific study of various issues related to the rights of the individual with regard to the environment. They denote the moral relationship of human beings with the environment. They deal with ecological rights of all
creatures present today as well as those that will follow on the earth. Environmental ethics refers to the responsibility to understand the environmental consequence of our consumption and need to recognize our individual and social responsibility to conserve natural resources and protect the earth for future generation.

Environmental ethics are basically human ethics based on social justice for all without discrimination of race, sex and religion. Most current environmental problems are essentially the result of activities of people and natural environment. Historically, individual and societal values have not always been in the best interest of preserving a high quality environment. The present day environment demands a change in attitude in order that initiatives can be taken to rescue the environment from destruction. The primary objective of Environmental Education is to provide knowledge and information about the world we live in. To live as an efficient member in the modern society, each citizen needs to know some facts of the natural phenomena, laws and properties of matter and the application of the knowledge and scientific principles that one comes across in our daily life. What is happening today is the arrogance of humanism with its dominant power to control and conquer nature. Ecological considerations should be applied in all our activities and decision making process related to developmental projects. However, the principle should not be extended to stop all types of developmental projects and strangulate human ingenuity. The need of the time is awareness on all these diverse aspects particularly among the young because they are quick in understanding, and giving priority to justice and peace.

In the present times, our nature has undergone an imbalance due to various human activities. This has lead to various problems like pollution, scarcity of water, unhealthy environment, etc.. The after effects of these may bring about death and extinction of various species of plants and animals. Poor environmental ethical sense leads to misbehaviour towards
environment. All over the world, a general feeling has been expressed that we must respect the rights of future generations. It is the duty of the present generation to protect the environment with all its biodiversity and indigenous culture for the generations to come. The ancient archaeological carvings of India show very clearly how the environment as a whole was treated as one entity in the country. We have always believed that man is the part of nature, not that man is master of nature. Our principle has been ‘Vasudhaikutumbkam’, meaning ‘the whole world is one family’.

Yet there is need to inculcate feeling of love towards nature in each and every one on this earth. The earlier this is done the better, because despite vast information we have on the dire consequences of human interface in the biosphere, many of our activities continue to harm the environment. We destroy forest covers, drain wet lands and pollute air, water and soil in various ways. The danger, that human activities may lead to rising sea level and global climatic changes, remains true. We do not own the earth or its resources. We are only the custodians. We have to pass on these resources intact to our future generations. It becomes our prime duty to preserve them as best as possible for the benefit of future generations. Living in a clean environment is everyone’s right. One generation cannot deny that right to another generation. It is high time, therefore, that Environmental Education becomes part of the education process at all levels and through it environmental ethics can be cultivated among students. For an individual to feel responsible towards the planet earth and its resources, Environmental Education is a must from childhood. If a child grows up admiring the beauty of nature and its infinite variety, he will definitely be concerned about the environment throughout his life. This will lead to the making of successive generations concerned about nature and natural resources.

Ethics have been defined in many different ways in literature. Ethics are viewed by some as the way people conduct themselves and make
decisions. Frisque et al. (2004) defined ethics in the philosophical context, indicating that ethics govern how people live their lives. Further, they refer to ethics as the norms, attitudes, and beliefs that are reflected in the way people treat each other and the manner in which people are able to adapt to the environment in which they find themselves. The manner in which personal ethical values are formed and developed is of particular interest to academia and the public. Thompson (2007) believes that the occurrence of unethical events is a result of the value differences in people, which cause them to act in ways that go against what society deems moral.

Environmental ethics are the part of environmental philosophy which considers extending the traditional boundaries of ethics from solely including humans to including the non-human world. It influences a large range of disciplines including law, sociology, economics, ecology and geography. Environmental ethics relate to the relationship between humans and the environment and are defined as a system of ethical values, human reasoning and knowledge of nature which endeavors to forge patterns of right conduct towards environment. These patterns are necessary so that needs of the present generation are fulfilled without compromising the ability of the future generation to meet their own needs (McDonough & Broungart, 2002). It is the area of study that can teach important information about the responsibility of academia to educate future decision makers in the area of environmental ethics so they will become more confident when standing up for their own opinion or resisting outer pressure if needed. Students may improve their critical thinking with a background in Environmental Education when decision making arise (Darwish et al., 2010). The academic field of environmental ethics grew up in response to the work of scientist such as Carson (1962) when environmentalists started urging philosophers to consider the philosophical aspects of environmental problems.
The concept environmental ethics is a philosophical discipline studying the moral relationships between human beings and the environment. Specifically, the emphasis is on the value and moral status human beings place on the environment and its non-human contents. Environmental ethics emphasize on the need to value nature or the environment and live sustainably in harmony within nature, and requires respect for the autonomy of not only the human beings but also of all creation (Callicott, 1995).

There has been an increasing interest in behavioral components of environment problems in recent years since human action is the critical element in environment degradation. The global problems are mostly caused by anthropogenic sources. Among the complex and delicate relations that concern the environment in terms of implementation of ethics and virtuous life styles for pollution control, waste reduction and management, deterioration of natural resources and decrease in biodiversity, new instruments in addition to existing traditional ways of transfer of knowledge can help to promote “environmental protection” and “sustainability”. That is, environmental ethics are needed to guide human-beings in making sound judgments and decisions and taking appropriate actions. However, it may not be developed and internalized by individuals by-themselves. Knowledge alone does not ensure one’s motivation to act; value/belief system is the key in determining any action whether positive or negative with respect to environment conservation. Therefore, the need to achieve the development of environmental ethics and adoption of new behaviours could be supported by many initiatives based on different instruments for example, communicative tools dealing with information, education and training. New environmental policies and strategies, in fact, together with the launch of new fashions and habits referring to the analysis, appreciations and diffusion of ‘best practices’ could be enlarged not only by means of innovative instruments such as e-learning, vocational training, interactive web-sites,
CD-ROMs for people involved in decision making but also for environmental experts employed in public/governmental organizations.

1.7 ENVIRONMENTAL ATTITUDE

The term attitude is commonly used in our daily lives. However, the term attitude is very complex and has many different definitions. There is no common definition of attitude. The Oxford Advanced Learners’ Dictionary of Current English (1995) defines attitude “as the way that you think and feel about somebody or something; the way that you behave towards somebody or something that shows how you think and feel”. This definition centers mainly on how a person believes, feels and then behaves in a certain way that reflects his established belief and feeling. Webster’s New Collegial Dictionary (1975), asserts the importance of belief as an integral component of attitude, and adds the “organism state of readiness to respond in a characteristic way to a stimulus such as an object, concept, or situation”. This definition indicates that individuals’ feelings are activated by a certain stimulus towards something, which in turn determines the behaviours of the individual. The Concise Oxford Dictionary of Current English (1990) defines attitude as “a settled opinion”. This settled opinion includes the individuals’ behavior, which displays his/her attitude towards the thing or the person concerned. Attitude is, then, seen as a settled “behavior or manner of acting” reflecting individuals’ feelings or opinions. This definition suggests that individuals’ beliefs are crucial in determining their behaviours. The International Dictionary of Education (1977) provides a comprehensive definition of attitude, which is adopted in this study. Attitude is defined as a “predisposition to perceive, feel or behave towards specific objects or certain people in a particular manner. Attitudes are thought to be derived from experience, rather than innate characteristics which suggest that they can be modified”. This definition includes beliefs, feelings and behaviours as dimensions of attitudes. It is through experience and maturation in the learning process that learners consolidate their feelings.
and beliefs consciously and unconsciously about a person, object or event. Also, attitudes are often associated with multiple, and even contradictory values (Schulltz, 2001). An attitude is learned through socialization, which includes parents, peers, schools, culture, religion and mass media. Children are not born with attitudes. An individual cannot have an attitude towards an object they have not encountered or received information about (Perloff, 2003). The concept of attitude has therefore, been defined in various ways by various researchers, usually depending on their specific theoretical framework and the constructs they investigated. Attitude can be defined as “a disposition to act which is built up by the integration of numerous specific responses of a similar type, but which exists as a general neural set and when activated by a specific stimulus results in behavior that is more obviously a function of the disposition than of the activating stimulus” (Thomas, 1971). It has also been defined by Fishbein & Ajzen (1975) as “a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object”. The attitude is also defined as the negative or positive feeling towards a state or a fact (Christo, 2004). In this research, attitudes meant the students’ responses to a number of statements regarding their learning with different teaching methods.

The inputs we gather through socialization and information about an object give rise to emotions and thoughts. These emotions and thoughts make us evaluate the object. Thus, if we have an attitude towards an object it means that we have made an evaluation about it. We have categorized the object and made a judgement about it. We are no longer neutral towards the object (Perloff, 2003). Fishbein & Ajzen (1975) define an attitude as a relatively stable, predominantly learnt disposition of an individual towards a specific object (for example people, things or ideas). They believe that an attitude consist of and is influenced by their component, namely the subject (a person with a specific attitude), the object (at which the attitude is directed) and the situation (in which the subject and object interact with one
another). A change in any of these components can cause the attitude to change. Chikin-Lee (1993) on the other hand defined attitudes as psychological tendencies that are expressed by evaluating a particular entity (for example the environment) with some degree of favor or disfavor. The evaluative response may be expressed as a cognitive tendency (thoughts and ideas about an object like the environment, for example); as an affective tendency (positive or negative feelings towards or about the environment) or a behavioural tendency (action towards the environment) or a combination of two or three of these psychological tendencies. An attitude only develops after a person has responded evaluative towards the attitude object and is then expressed or manifested in overt cognitive, affective or behavioural responses. Attitudes are highly dynamic and for that reason attitudes can also be changed. We can learn to have a different attitude. Attitude change in education can be mediated by information and experiences, which we respond to emotionally and make evaluations about. The researchers break the definition of attitude into three components. Attitude is learned; it predisposes action; and such action or behavior is generally consistent. Attitude is a specific mental state of the individual towards something according to which his behavior towards it is moulded. Social attitudes play an important part in directing man’s social behavior. Man’s behavior is influenced by his beliefs, assumptions and decisions and these are affected by the individual’s attitude towards different persons and objects. They are motivating forces. Hence it is only natural for the individual’s social behavior to be influenced by these attitudes. With the above elements in mind, an environmental attitude is defined as a person’s general positive or negative feelings towards the natural surroundings of humankind, including air, water, land, wildlife and the system existing between the natural environment and human society.

There appears to be consensus among the various definitions of the attitude regarding the following an attitude is evaluative in nature, is learnt;
is relatively lasting; is always involving an object and predisposing the subject to act in a specific manner towards a given object.

Environmental attitude is a hypothetical construct that represents an individual’s like or dislike for environment and its problems. Environmental attitudes are positive, negative or neutral views of an individual about environment and related issues. These are the individual views and feelings about population explosion, health and hygiene, environmental pollution, wildlife, forests and environmental concerns or the way the individual tends to behave towards it, often in an evaluative way.

However, the attitude towards environment was certainly shaded by awe reverence, and fear of disease, wild animals, famine, storms, earthquakes, volcanoes, celestial phenomenon and countless other events which were not understood. In the last few years there has been a remarkable ground swell of popular interest in the issues of ecology and environmental quality. The public has become acutely aware of polluting, crowding and landscape deterioration. Among young people there is a renewed interest in trying once again to live in harmony with nature and slow down or stop the despoliation which has accompanied progress so far. Environmental attitudes refer to the people’s favorable or unfavorable feelings towards some features of the physical environment. However, since attitudes influences behavior to an extent, attitude change is likely to change behavior and thus, adopting pro-environmental attitudes is likely to even change environmental behavior. Therefore, attitudes are important in the process of reaching a sustainable development since it requires a change of people’s lifestyles.

Researchers such as Schulttz (2001) believe that people’s attitudes towards the environment and the type of concern they develop towards the environment are associated with the degree to which they view themselves as interconnected with nature. Stern; Thomas & Linda (1993) agree and add that a person’s attitude towards the environment is based on the relative
importance that a person places on him or herself, other people or natural environment. In other words a person’s attitude towards the environment is based on his or her general set of values. They add that people with different value orientations will ultimately have different attitudes towards the environment.

Since attitudes are learnt, education is very likely to contribute to the formation of attitudes. Therefore, Environmental Education is important in the process of environmental attitude formation and thus also to predict environmental behavior. According to Dunlap, et al. (2000), education is the main contributor in the process of developing environmental attitudes. Several studies in the past decades have found that higher levels of education have a positive effect on environmental attitudes (John, 1977). A person with a high level of education is likely to have a broad perspective on ideas and beliefs, which encourages an open-minded attitude towards environmentalism (Dunlap, et al., 2000). According to a study in Korea during the early 90’s, a connection between higher education and pro-environmental attitudes was found even though the subjects that were highly educated were not considered to have had strong relationships to nature (Yanghee, 1993). However, in the same study it was also found that the stronger the subjects felt the harm of environmental problems, the more concerned they were about environmental issues and in this case it did not matter what level of education they had. Interestingly, in this study, people with higher education expressed more skeptics to that technology could be the solution to environmental problems. Also, in a study by Boeve-de Pauw (2010), there is a link between student’s performance in science and pro-environmental attitudes. However, some studies have also shown the opposite. In a study about the effects of environmental attitude change after completing an environmental course, the result was that no significant attitudinal change took place. A lot of this could depend on the reason to why the students took the class. If the reason was to pass exams and to
achieve their grades, the students might not take the knowledge into an appropriate cognitive structure and, therefore, an attitude change could not take place. Also, the quality of the course must also be taken into account (Yount, 1992). However, the correlation of learning and exposure to nature, both nature’s degradation and positive experiences have been studied and might be a key factor in pro-environmental attitude formation and in Environmental Education (Boeve-de Pauw, 2010). Outdoor education in nature has been investigated as a key factor in Environmental Education. A case study in Belize, which is a country in South America, indicates that students who attained an educational program for five days in the forest transferred environmental attitudes towards a positive direction. At first, some of the students were afraid of the forest. The students were encouraged to talk about their fears during the program and at the end of the program most of the fears had diminished. Most of the students also wanted to spend more time in the forest and expressed pro-environmental attitudes (Emmons, 1997). In addition, in a study in Malaysia an investigation about the effects on outdoor Environmental Education was conducted. The results of this study indicated that activities in natural surroundings enhance the relationship towards nature and increased the student’s empathy to nature. According to the researcher, this might influence the participants to act environmental friendly (Taff, 2010). To conclude, Environmental Education is, most likely, contributing to the process of environmental attitude formation since attitudes are learnt. Environmental attitude means to acquire values, feelings of concern, and motivation towards the participation for improving the environment and protecting it. If we are exposed to information about the environment we can respond to it and evaluate it and thus, form an attitude. However, it is also possible that the information passes us by and is not taken to a cognitive level. In that case, there might not be an attitude formation. Thus, the quality of education must also be taken into account for contribution to environmental attitudes.
1.8 **ICT IN EDUCATION**

The purpose of education is to manage students’ learning and the value of any technology used in education must, therefore, be measured by its capacity to affect learning. Improvements in technology, changing thinking patterns about students’ learning, active learning and constructivist approaches domination in the teaching learning process are bringing in radical changes in the role of teacher in classrooms. Teacher has to be a facilitator of knowledge in present days, as students have many other channels of getting information and knowledge about content. This has made teacher to employ innovative ways of teaching rather than using traditional lecture method. Teacher has to use different approaches where student will come to know about different channels of getting information related to content. This also caters to the needs of individual differences existing in the classroom. In wider perspective, technology today seems to hold out more benefits than ever before. Information and Communication Technology (*ICT*) is one of the recent developments of the twentieth century in India. *ICT* refers to electronic means of capturing, processing, storing and disseminating information. *ICT* (Information and Communications Technology) is an umbrella term that includes any communication device or application, encompassing computers, Liquid Crystal Display (LCD) Projector, Over Head Projector (OHP), Power Point Presentations and internet, as well as the various services and applications associated with them for handling information. It is an effective tool for assimilating processing and disseminating information. Government of India took serious view of it and its application was initiated in 1998. The introduction of *ICT* into mainstream school has been widely accepted and now penetrates and transforms teaching and learning across the curriculum. *ICT* is assumed to offer a wide spectrum of benefits for the actual teaching and learning process. The term Information and Communication Technology encompasses the range of hardware (desktop and portable computers,
projection technology, calculators, data logging and digital recording equipment), software applications (generic software, multimedia resources) and information systems (Intranet, Internet) now available in schools (Hennessy et al., 2005). ICT is not only the backbone of the information society, but is also acts as an important catalyst for inducing educational reforms that change our students into productive knowledge workers (Pelgrum, 2001). The educational potential of ICT is stressed in a variety of ways. For instance, Godfrey (2001) stresses the potential of ICT to present rich learning environments allowing learners to adopt multiple perspectives on complex phenomena, to foster flexible knowledge construction in complex learning domains, and to cater to individual differences. Instruction provided through computers, LCD, OHP, Power Point Presentations provides opportunity for the learner to use maximum senses to get the information. It breaks the monotony and provides variety in the teaching-learning situation. In today’s information age, providing instruction about Environmental Education through ICT develops an understanding and application of the concepts, expression power, reasoning and thinking power and proper study habits among students. The objectives of Environmental Education are multi-dimensional in nature, so for their achievement multiple technologies should be used in an integrated fashion. At present, ICT can be used for this purpose as it helps in drawing the attention of the learner to a particular concept, which not only creates interest among the learners but also motivates them to learn. This learning helps the learners to become conscious about their environmental and related issues. Environmental Education enable the child to become aware of the environmental hazards such as pollution, deforestation, environmental health problems, etc.. To realize the relationship between various concepts, children must visualize as they read. But it is difficult to visualize what has been read when it is not within the experiences of the children. For this reason, it is the teacher’s responsibility to provide visual aids of all kinds including motion pictures. This will ultimately lead to mastery in learning.
Today ICT based instructional materials have been recognized by the teacher and educationists as indispensable, and integral component of instructional materials despite both formal and informal education. Besides, several researches have explored the contribution of filmstrips to learning. Various types of video classes and television transmissions are also available. Educational technology plays a key role in the classroom situation. Learning through ICT helps a child to retain what is learned for a long time and permits easier transfer of learning.

1.9 RATIONALE OF THE STUDY

Human being is not only dependent on the physical environment for livelihood, but also in a number of ways they are capable of controlling and influencing the physical environment. Due to continuous influence of human being on the environment, the world scenario has undergone great upheaval during the last century. Technological advancement, ever increasing industrialization and the tendency of masses to settle down in urban area, increasing craze for mega cities and high tower buildings without considering the width of the roads and parking areas have been causing further congestion and damages to the environment thereby degrading the environment much faster than economic growth. The repercussion of deteriorating environment conditions has been casting negative impact on the ecological conditions on the globe. Due to the activities pertaining to over exploitation of biotic and abiotic components, ecological balance is being disturbed day-by day. In the present age of technological revolution, the needs of human being are destroying the nature brutally. Insensitive and irrational exploitation of natural resources and effects of destroying the nature can be seen in the form of global warming, ozone layer depletion, increasing amount of chlorofluorocarbon, acid rain and green house effect, etc.

Environmental degradation is often mentioned as the consequence of human negligence on the one hand, but on the other, it more often than not is
the intention of an individual or collective actions that has put economic gains as of utmost importance. As such, in the process of economic and infra-structural development, environment has not been given its due respect and has often been sidelined which leads to further degradation of the environment. Hence, the environmental crisis is arguably one of the greatest challenges facing humanity in this century. All such unchecked activities of human beings has brought about drastic imbalance in the nature and its phenomenon. Now, even nature is threatening mankind in the form of drought, floods, earthquake, landslides, epidemics etc.. The emergencies produced by natural disasters, and the shortage of water, along with other problems, are a daily reality that is changing the existing patterns of life and compromising the expectations of future generations. The manner in which the environmental crisis is confronted will be decisive in determining the quality of life to which present generations can aspire, and the possibilities of life for future generations. The margin of action, however, is not very wide; experts believe that within decades we will have reached the point at which the changes in ecosystems are irreversible (Leadley, 2010). Environmental problems have reached up to a level where almost everyone is conscious of them. The increasing consciousness has also given rise to a wide spread responsiveness to the idea for the need to do something about it (Chhokar, 2000). As far-as the prevailing situations are concerned, there is a great need that the society should not only be aware of the present deteriorating environmental conditions but it should also feel the responsibility to save the environment.

Environment problems are not the problems of developing countries like India but it is concerned with the whole globe. It is the need of hour to make the whole society conscious about the ecosystem and ecological balance. Education is a powerful medium for changing our behavior. Recommendations of the Stockholm conference in 1972 declared that there was close link between the society and the environment and that the
relationship between them was at a critical stage. The reports state that “a point has been reached in history when we must shape our action throughout the world with a more prudent care for their environmental consequences” (Basu, 1991). Thus, this is a crucial time to realize that environmental sensitivity and environment friendly behavior should be cultivated among masses particularly among youths. For the awareness of the society about the environment, it is essential to work at grass root level so that the entire society can work to save the environment. If we want to inculcate environmental values in our children in due course, we will get the saplings in the form of adolescents which will be nurtured into trees, i.e., into citizen having responsibility towards environment. Consequently, education has been recognized as one of the important tools for conserving the environment through the cultivation of knowledge, skills, values and positive attitudes towards the environment among the people. It is common practice that any social change to be introduced to the society is incorporated in the school curriculum with an assumption that it will lead to generational change. Thus, the need for and importance of Environmental Education has been emphasized through a series of intergovernmental forums and documents from the 1970’s as a strategy for addressing the growing trend of environmental problems. Mainly, the need for Environmental Education was realized and emphasized at the United Nations Conference on “Human Environment” held in Stockholm in 1972. In this conference it was recommended that “the organizations of the UN system especially the United Nations Educational Scientific and Cultural Organization (UNESCO) and the other International agencies concerned should, after consultation and agreement take the necessary steps to establish an international programme in Environmental Education, interdisciplinary in approach, in schools and out of school encompassing all levels of education”. (UNESCO, 1972 p. 19).
Like many other countries, India, as one of the member states in international conferences on the environment, has responded to global concern about the environment and international declarations by including concepts of Environmental Education (EE) in the school curriculum at all levels.

So, it becomes essential to educate and train children regarding the significance of healthy environment through Environmental Education. When the pupils learn about the functioning of ecosystem and about environmental actions and strategies that contribute to their maintenance, they develop more environmentally responsible behavior on a daily basis. Now, it becomes all-the-move essential that teacher should also have knowledge of environmental issues, sensitivity and, proper attitudes towards the environment and appropriate action strategies for solving various problems related to the environment, so that similar environmental sensitivity, awareness, attitudes and ethics can be taught and developed among school students. The instructions should be given in such a way that they not only provide information but also lead to understanding of the concepts and retaining the information. But, research findings on the teaching of Environmental Education show that despite the fact that it is integrated in the content of different subjects, teachers do not teach it because they lack knowledge and skills in the teaching of Environmental Education (Bolstad, 2004) and few get the opportunity to see how Environmental Education is taught (Mtaita, 2005). Although Makundi (2000) supports this argument, she further attributes this situation to the approaches and methodologies used in teaching. She points out that the teaching and learning methods used, emphasize knowledge gathering only. As such, students can have knowledge about environment but do not take action. Similarly, Spiropoulou et al. (2007) argue that the implementation of Environmental Education has been less effective due to the traditional teaching approaches, inflexible curricula, a lot of content to be learnt and
insufficient time for an in-depth approach to the study of environmental matters and lack of skills in integrating Environmental Education into traditional subject content. It can be said that it is true that the traditional approach to teaching which is based on transmission of knowledge cannot help learners develop the skills, actions and competence necessary for taking action on the environment. The traditional method of teaching reduces the intensity and essence of the subject with its major concentration on theoretical aspects and examination. In the present scenario of school education, however, teachers, parents and students are more focused on high scores and results. So, the purpose of the Environmental Education curriculum has failed in many aspects.

At the institutional level, teaching concepts of Environmental Education is considered an activity secondary or complementary to the training of students, and the responsibility for it rests solely on the instructors who teach the subjects of Biology and Ecology, whose support depends on the availability of resources and spaces. Thus, the activities or projects carried out in the schools rely heavily on the initiative or the interest shown by the individual teachers. Therefore, in an educational system that emphasizes the rote memorization of information, and focuses on teaching basic environmental concepts, we would expect to see a greater impact of Environmental Education on the knowledge of environmental problems-which obliges us to question the quality of the Environmental Education pupils are receiving. It seems probable that the low level of environmental knowledge, pupils’ unfamiliarity with the functioning of ecosystems in all their complexity, and their lack of understanding of the interdependence of natural and human systems, is explained by the lack in the teachers’ teaching method used for teaching concepts of Environmental Education. If the students’ lack basic environmental knowledge, it is difficult to expect a favorable change in their behavior toward the environment. This lack is due to the low priority given to Environmental
Education, which promotes a type of teaching focused on providing decontextualized information, superficial and insufficient. To raise the level of environmental awareness among young people it is necessary, first, to recognize Environmental Education as a priority for all factors in the education sector. This implies providing more resources and infrastructure for it, and making it a compulsory subject at all levels of the formal education system. Finally there must be consistency between what is taught, and what actually happens in the school environment, in the family and in society. In general terms, the teaching of environmental concepts should such that the students should feel that Environmental Education is a way of teaching people to conserve and value the environment. For this, the students should be provided with visual experiences along with verbal experiences about the environment. This creates interest among the students about the subject and also motivates them to learn. For providing such experiences to students ICT can be utilized to a large extent. At the grass root level, technology-oriented education like ICT can effectively influence the students to act. Communication with new technology-based education and application-based curriculum can motivate the students to respond to the burning issues of global warming and climate change. ICT can play the role of a facilitator of development, disseminator of information and an agent of change in the society. It can play a key role in spreading the true message of issues of environmental awareness and presenting it consciously. When students learn through ICT about the functioning of eco-system and about environmental action strategies that contribute to their maintenance they will develop more environmentally responsible behavior.

Keeping in view all these facts, and the discussion in the preceding paragraphs and after reviewing the studies conducted in India and abroad, it was found that not much work has been done in the area of preparation of Environmental Eduaction Programme Utilizing ICT. Thus, the investigator decided to develop an Environmental Education Programme Utilizing ICT.
and study its effects in influencing Environmental Sensitivity, Awareness, Ethics and Attitudes among Secondary School Students.

1.10 STATEMENT OF THE PROBLEM

The selected research problem is stated here-

EFFECTIVENESS OF AN ENVIRONMENTAL EDUCATION PROGRAMME UTILIZING ICT IN INFLUENCING ENVIRONMENTAL SENSITIVITY, AWARENESS, ETHICS AND ATTITUDES AMONG SECONDARY SCHOOL STUDENTS

1.11 OBJECTIVES OF THE STUDY

The main objectives of the study are:

1. To assess the degree of Environmental Sensitivity, Awareness, Ethics and Attitudes among Secondary School Students.

2. To develop an Environmental Education Programme Utilizing Information and Communication Technology (ICT) for Secondary School Students.

3. To implement the designed Environmental Education Programme on Secondary School Students.

4. To compare the Effectiveness of Environmental Education Programme Utilizing ICT and Traditional Method of Teaching in improving Environmental Sensitivity among Secondary School Students.

5. To compare the Effectiveness of Environmental Education Programme Utilizing ICT and Traditional Method of Teaching in enhancing Environmental Awareness among Secondary School Students.

6. To compare the Effectiveness of Environmental Education Programme Utilizing ICT and Traditional Method of Teaching in cultivating Environmental Ethics among Secondary School Students.
7. To compare the Effectiveness of Environmental Education programme Utilizing ICT and Traditional Method of Teaching in developing positive Attitude towards Environment among Secondary School Students.

1.12 HYPOTHESIS OF THE STUDY

Following research hypothesis is formulated for the present study:

Environmental Education Programme Utilizing Information and Communication Technology (ICT) will be more effective than Traditional Method of Teaching in influencing Environmental Sensitivity, Awareness, Ethics and Attitudes among Secondary School Students.

1.13 DELIMITATIONS OF THE STUDY

The present study is delimited to:

- one CBSE affiliated school (Kendriya Vidyalaya) of Ganganagar district only.
- students of class IX.
- one hundred students only.
- the concepts and topics of Environmental Education only.

A comprehensive review of past studies is necessary in any research endeavour. Review of Related Literature helps a lot in developing a wider perspective of the variables selected for the study. The investigator reviewed the related studies in the next chapter i.e. Review of Related Literature.